

### ABSTRACT OF THE DISCLOSURE

A method and an apparatus that provides efficient heating of a dielectric structure without compromising the dielectric properties of the structure. A heating assembly is adapted to fit a circularly shaped dielectric lid of a plasma processing vacuum chamber. The heating assembly is placed between the RF coil and the atmospheric side of the dielectric lid. Although the active heating structure portion (a resistive heating wire or a thermal working fluid or both, per alternate embodiments) of the heating assembly is transparent to the electromagnetic fields produced by the coil, the conductive portion of the heating assembly takes on the role of shaping the electric field. The result of this averaging is the minimization of detrimental effects of electromagnetic potentials that are too high (e.g., sputtering of the dielectric by the plasma) and of electromagnetic potentials that are too low (e.g., heavy by-product depositions on the dielectric lid).

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